REMARKS

Claims 1-65 are pending in the instant application. Claims 22, 27, 64, and 65 and the specification are amended by this amendment. No new matter is added by the amendments, which find support throughout the specification and figures. In particular, the amendments are supported in the specification at least at figure 6, step 120. It is respectfully submitted that the amendments do not require additional search, simplify issues for appeal, and/or place the claims in condition for allowance. Therefore, it is respectfully requested that the amendments be entered. In view of the amendments and the following remarks, reconsideration and allowance of the instant application are respectfully requested.

Applicants note with appreciation that the Examiner acknowledges that claims 11, 43, and 58 are allowable. Applicants note that claim 27 was evaluated as directed to patentable subject matter in the Office Action of February 6, 2006, and is not mentioned in the present Office Action. Applicants respectfully request clarification of the status of claim 27 in the next Office communication. Additionally, claim 27 is amended herein to include the features of its respective base claim, and it is respectfully submitted that this claim is in condition for allowance.

Claims 1-10, 12-42, 44-57, and 59-65 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Applicants respectfully traverse.

Applicants respectfully direct the Examiner's attention to step 124 of figure 6 in support of the claimed feature. In particular, the specification states:

> FIG. 6 is a flow chart showing steps followed by system 10 on
> addition or removal of a cache or disk node from system 10,
> according to a preferred embodiment of the present invention. In a
> first step 120, a cache or disk node is added or removed from
> system 10. In an update step 122, system manager 54 updates
> mapping 28 and/or track location table 21 to reflect the change in

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> system 10. *In a redistribution step 124, system manager 54
> redistributes data on disks 12, if the change has been a disk
> change, or data between cache nodes 20, if the change is a cache
> change. The redistribution is according to the updated mapping
> 28, and it will be understood that the number of internal IO
> transactions generated for the redistribution is dependent on
> changes effected in mapping 28. Once redistribution is complete,
> system 10 then proceeds to operate as described with reference to
> FIG. 4.* It will thus be apparent that system 10 is substantially
> perfectly scalable.

(Specification; paragraph 0085; emphasis added). As is apparent from the Background section of the specification, a cache is an "interim-fast-access-time node" ("A cache, a fast access time medium, stores a portion of the data contained in the disk" (Specification; paragraph 0003)). Furthermore, the Summary discusses "a plurality of fast access time cache nodes" (Specification; paragraph 0010). It is apparent that the specification as originally filed discloses the features of "wherein the interim-fast-access-time nodes are configured to be reassignable to a further second range of the LBAs." Therefore, it is respectfully requested that the rejections be withdrawn.

Regarding claim 64, Applicants submit that the amendments to claim 64 clarify the claimed subject matter. In amended claim 64 "the interim-fast-access-time nodes are configured to be reassigned based on a removal of at least one of the interim-fast-access-time nodes or one of the slow-access-time-mass-storage nodes." It is respectfully submitted that the *removal* of a node is discussed throughout the specification and at least by step 124 of the figure 6. Furthermore, the reassignment feature of claim 64 is supported throughout the specification, and at least by:

> [a]t setup of system 10 system manager 54 assigns a range of
> LBAs to each cache node 20. Manager 54 may subsequently
> *reassign* the ranges during operation of system ....

(Specification; paragraph 0056). Therefore claim 64 as presented is supported by the original specification and the rejection should be withdrawn.

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Claims 1, 65, and 65 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Applicants respectfully traverse.

The Office Action states that it is unclear how the plurality of interim-fast-access-time nodes comprise tables in light of the Specification, which appears to link the tables to the nodes.

Claim 1 recites "a further second range of LBAs" distinct from the previously recited "respective second range of LBAs". Both second ranges refer to reassigned or redistributed data, but they represent distinct second ranges. The further second range of LBAs represent another range to which data is reassigned or redistributed. Therefore, this second range is provided with a distinct name, a further second range, to distinguish it from the second range previously recited in the claim. It is respectfully submitted that the claim as presented is definite, since the respective second range and the further second range are recited as distinct elements. Therefore Applicants respectfully request that the rejection be withdrawn.

Claims 64 and 65 have been amended herein to clarify the claimed subject matter For instance, claim 64 now recites that "the interim-fast-access-time nodes are configured to be reassigned based on a removal of at least *one of the plurality of interim-fast-access-time nodes* or *one of plurality of the slow-access-time-mass-storage nodes.*" It is respectfully submitted that the claim as presented, and claim 65 which has been similarly amended, are clear and definite. Therefore, it is respectfully requested that the rejection be withdrawn.

Claims 1-6, 8-10, 12-22, 24-26, 28-38, 40-42, 44-53, 55-57, 59-62 are rejected under 35 U.S.C. 102(a) as being anticipated by United States Patent No. 6,898,666 to Henry et al. (hereinafter referred to as Henry). Applicants respectfully traverse.

Claim 1 relates to a storage system that includes, *inter alia*, one or more slow-access-time-mass-storage nodes, coupled to store data at respective first ranges of logical block

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addresses (LBAs), and a plurality of interim-fast-access-time nodes, configured to operate

independently of one another, each interim-fast-access-time node being assigned a respective

second range of the LBAs and coupled to receive data from and provide data to the one or more

slow-access-time-mass-storage nodes having LBAs within the respective second range; and

one or more interface nodes, which are adapted to receive input/output (IO) requests from host

processors directed to specified LBAs and to direct all the IO requests to the interim-fast-access-

time node to which the specified LBAs are assigned. In the storage system of claim 1, *the*

interim-fast-access-time nodes are configured to be reassignable to a further second range of

the LBAs.

The Examiner asserts that Henry discloses the feature of the interim-fast-access-time

nodes are configured to be reassignable to a further second range of the LBAs. However, the

section of Henry cited by the Examiner states in its entirety:

> FIG. 5 illustrates a table which assigns certain logical block
> addresses to certain cache pools. When an I/O is received, the LBA
> is determined to be in a certain range and that range determines
> which cache pool is used. No matter what the logical block size is,
> the assignment is performed in the same manner as it is based on
> the LBA number. When an I/O spans multiple LBA ranges, two
> XOR operations are required. The assignment shown in FIG. 5 is
> made on a rotational basis. Accessing different LBA ranges uses
> separate memory complexes which use separate paths resulting in
> load balancing on those paths.

(Henry; col. 5, lines 45-55). The Examiner states parenthetically in regard to this feature that "the

system *is not prevented from being reconfigured* in the future to support a different set of LBA

values" (Office Action; page 5, lines 6-7). This statement is completely unsupported and

represents pure speculation on the part of the Examiner. The fact that the system of Henry *may*

be modified to perform a function of the claimed system does not satisfy the requirements of 35

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U.S.C. 102, which requires that the reference *identically disclose each and every feature* recited in the claim. There is no discussion in Henry relating to reassigning. Furthermore, there is absolutely no discussion or suggestion in Henry relating to *reassigning* the interim-fast-access-time *nodes* to a *further second range of the LBAs*, and therefore for at least this reason claim 1 is allowable.

Independent claims 17, 33, and 48 include features similar to those discussed above in regard to claim 1, and therefore these claims are allowable for at least the same reasons as claim 1 is allowable.

Claims 2-6, 8-10, 12-16, 18-22, 24-26, 28-32, 34-38, 40-42, 44-47, 49-53, 55-57, and 59-65 depend from one of claims 1,17, 33, and 48, and therefore each of these claims is allowable for at least the same reasons as their respective base claims are allowable.

Additionally, claims 8, 12, 24, 28, 40, and 55 each recite the feature of the respective second ranges are spread sufficiently evenly and finely so as to generate well-balanced loading for the plurality of interim-fast-access-time nodes, or a similar feature. The Examiner cites to Henry as disclosing this feature (Office Action; page 6, lines 15-17), however the cited section states in its entirety:

> Assignment of data regions to cache pools are made to ensure all access to any piece of data always uses the same cache pool. A software algorithm, implemented through a computer program of instruction code on the disk controller, or any appropriate mechanism, performs the assignment. As long as all data needed for any one XOR operation is assigned to the same cache pool no XOR operation is split between cache pools. This ensures simple and fast operation.

(Henry; col. 5, lines 1-8). However, the cited section of Henry does not disclose or suggest anything regarding well-balanced loading, and therefore does not disclose or suggest the features
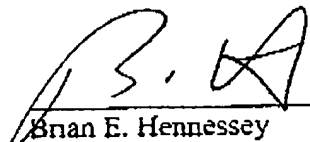
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of these rejected claims. Therefore, for at least this additional reason, claims 8, 12, 24, 28, 40, and 55 are allowable.

Additionally, claim 65 recites that the interim-fast-access-time nodes are configured to be *reassigned based on rebalancing a load* between at least one of the plurality of interim-fast-access-time nodes or one of the plurality of slow-access-time-mass-storage nodes. It is respectfully submitted that, since Henry does not disclose reassigning nodes, as discussed above, and since Henry does not disclose balancing a load, as also discussed above, Henry does not disclose or suggest this feature of claim 65. Therefore for at least this additional reason claim 65 is allowable.

In view of the remarks set forth above, this application is in condition for allowance which action is respectfully requested. However, if for any reason the Examiner should consider this application not to be in condition for allowance, the Examiner is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged to Deposit Account No. 50-1290.

Respectfully submitted,

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